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LEAD SUBSTITUTES FOR PIPE JOINTS[1]

Mr. W. Luscombe:[2] I have never tried anything but pig lead. Some representatives, speaking to me of leadite, stated that in Philadelphia it is now being extensively used several blocks from here, on a considerable mileage of large mains under streets where it is extremely difficult to reach the joints. Philadelphia must have found it very satisfactory, or else they would not have used it. However, I have never used anything but pig lead, which I have always found satisfactory.

Mr. W. C. Hawley:[3] I have some 75 miles of pipe laid with leadite joints. It has been entirely satisfactory and is much less expensive. I figured that we have saved about 60 per cent in the cost of the joints during the recent war period. The other day my foreman brought in a piece of joint which was taken out of a ten inch pipe where the line had settled into a coal mine, and in breaking out the bell he had the joint in pretty nearly one piece. There was no evidence whatever of any deterioration in the metal. It was as perfect as any jointing material could be. We are using it under all sorts of conditions, in trenches four to four and a half feet deep, which stand the vibration due to the use of heavy automobile trucks, and we are using it under pressure up to 210 pounds and in sizes from four to thirty-six inches.

Mr. E. T. Cranch:[4] I would like to ask about the experience necessary in handling leadite. I have never used it myself. I have been approached by representatives to undertake it and have discussed it with several. The principal objection I could find is that I am told you are likely to overheat it and it is no good if it is overheated. I wonder what the experience has been in that line?

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[1] Discussion at the Philadelphia Convention, May 18, 1922.

[2] Vice-President, Gary Heat, Light and Water Company, Gary, Indiana.

[3] Chief Engineer and General Superintendent, Pennsylvania Water Company, Wilkinsburg, Pa.

[4] Superintendent, Water Department, Petersburg, Va.

Mr. W. C. **Hawley**:[3] Leadite is different from lead and has to be handled differently, but, used with any intelligence, there is no reason why good results cannot be had. As far as overheating is concerned, that is the thing to do. It comes in the form of black powder and as it melts it should be stirred. It will froth and foam, and then as it gets a little too hot, it begins to thicken like a black oatmeal mush and that is the time to take it away from the fire or take the fire away from it, and to continue to stir it. It will thin down until it is like a thin black oil, and then it is ready to pour. If poured from the proper height, eight or ten inches, there is no difficulty at all. Anybody can use it, but it is just enough different from lead to require a little different treatment. We break in an Italian boy to pour the joints. It does not require expert labor. We get rid of all the trouble with caulkers and that sort of thing, and we find a saving, as I said, of 60 per cent in the cost of the joints.

Mr. J. E. **Gibson**:[5] I want to reinforce, if I can, what Mr. Hawley has said. I have used leadite now for about four years, and have found it entirely satisfactory. I did have difficulty when I started to use it. I got it afire and smoked everybody out of the community in that section, but now we have gotten on to it and find it very satisfactory. During the last two years we have rebuilt our filter plant, and, as we all know, the pipe gallery is forgotten until we begin to erect the pipes, and then we find we have four feet of space for six feet of material. We used leadite there and saved a good many dollars, because without leadite, if it had been necessary to caulk lead, we would have had to put in flanged pipes. We could pour the leadite in six inches of space and no caulking was needed. We did have leaks under those conditions in one or two cases. We had a stream pouring out of a twenty-inch connection that would fill a gallon pail in a few minutes, but after eight or ten days the leak stopped and since then we have painted the pipes without any difficulty whatever.

We cannot use it in water that will not rust We have in Charleston an artesian supply. It carries about 2000 grains per gallon of soda, a good mineral water for drinking and bathing, but it is not useful for anything else. Laundry work done with it is most splendid. It will wash clothing and it will come out beautifully white. That water will not rust iron. I took out in 1921 some pipe placed in 1897. The threads were just as sharp as the day they were turned out of the die, the tool marks were still there but, after twenty-four hours' exposure in the salt air of Charleston, they were rusted. But there was a pipe absolutely clean that had been submerged for twenty some odd years. We have got the artesian pipe still in the ground, and people still want that for bathing. We have repaired a few joints with leadite on that, but it will not hold, so if you have a water that will not rust ordinary iron, I would not suggest that you experiment with leadite. It seems to have that quality of rusting tight like our old style rust joints that we made years ago.

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[5] Superintendent, Water Department, Charleston, S. C.

Mr. W. F. Wilcox:[6] I do not know anything about leadite, but I was going to give an experience with pipe joints in our district. We laid two miles of 24-inch pipe carrying a million cubic feet of gas an hour under 10 pounds pressure. In that two miles of line we finally drove up 3500 leaks. We had to put in another line to carry two million cubic feet of gas an hour under 10 pounds pressure, and we put in a joint there by using one inch of untarred jute yarn, driving that up hard, and then drove in one inch of lead wool, then another inch of jute yarn and cast on top of that an inch and a half of poured lead joint and drove it up. In three miles, the 36-inch pipe carrying two million cubic feet of gas under 10 pounds pressure, the joints we have had to redrive have been so negligible that we have not kept any record of them. On the first line, with the same joints, we spent more in redriving leaks than it cost us to lay the original line. That looks like a complicated joint, but it did make a big difference.

Mr. W. C. Hawley:[3] Perhaps the convention will be interested in a test we made the other day of a line of 6 inch pipe 7800 feet long we laid with leadite early last fall, but which we did not test until just before cold weather. The test was not satisfactory. The joints had all been tested in the trench, but there was evidence of too much leakage. Probably they did not get the curb tap turned right or something, but we retested that line about three weeks ago, and the first seven minutes the meter registered two-hundredths of a cubic foot and in the next ten minutes, six-hundredths of a cubic foot. That rate of registration is probably too small to indicate

[6] Superintendent, Central Water Works, Ensley, Ala.

satisfactory results, that is, I mean the meter can hardly be expected to register accurately at such a low rate, but at any rate the leakage is very small in about 7800 feet of 6-inch pipe.

Mr. H. F. Cox:[7] I should like to add our testimony. In Scranton we have the same trouble. Our Wilkesbarre people have been using leadite three or four years. We made a visit down there to see how it was done, and it is largely a matter of skill in heating. They use common labor and we have been doing so since. Our trouble was under tracks, and we have put leadite in and have had no trouble. We have not used it under paving yet. We also had mains joined over the bridge under tracks and also ran the leadite where we could watch them. As Mr. Gibson said, we had small leaks which continued for a period of four or five weeks, but finally it all took up, so our experience with it has been very successful so far.

Mr. G. G. Dixon:[8] Like some other places, Akron had a little unfortunate experience a number of years ago with leadite, and in recent years we have never used it in practical quantities, but last year we put in about 2000 feet of 10-inch pipe in about as bad a piece of trench imaginable. It is very difficult work. It was placed in February or March. Leadite was used and no service connections were made into the main for some time after it was completed, so as to give an opportunity for testing accurately with a pressure meter. This was done, and something over 100 pounds pressure was found. The meter was read daily for a period of two weeks, during which time the leakage dropped from about 500 gallons per day per mile of pipe to about 250. Our standard of leakage in those times was about 200. The meter was then read again about a week and a half later, and the leakage had by that time dropped a little below our standard of 200. It took something between three and four weeks for the leakage in that case to drop down to our standard.

Mr. J. A. Jensen:[9] You may be interested in our experience in Minneapolis. We had a section cut off temporarily and there was laid on the top of the ground a 6-inch main. Some people interested in substitutes for lead asked for an opportunity to make a demonstration and we thought we would give them a chance on this line. They did not get on the job right away, so we started to make lead joints and they finally came out and finished the job with substitute. The line was in service for 90 days, and they made the joints themselves according to the usual practice with a high gait. At the end of 90 days, when we were ready to take the pipe out, we made an inspection, and I might say that, out of the 45 or 50 joints that were made, there were only about 2 that you could call passable. There was a great deal of leakage, but all of the lead joints were dry. Where we laid the pipe 8 feet below the grade of the street, we might hesitate about taking any other material as a substitute for lead. The joint is the weakest point in the pipe line, and, therefore, we would hesitate naturally about using something that might be inferior. We figured out that, of the total cost of a line of 12-inch pipe, the cost was about 2 per cent more by using lead, and we felt that that was might cheap insurance.

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[7] Chief Engineer, Scranton Gas and Water Company, Scranton, Pa.

[8] Chief Engineer, Bureau Water Works Improvement, Akron, Ohio.

[9] Supervisor, Water Works Department, Minneapolis, Minn.

Mr. S. H. TAYLOR:[10] Perhaps I should give you the benefit of New Bedford's experience in lead pipe. I was very skeptical and thought I was going to avoid using it by proving it to be no good. About 15 years ago there were a few joints made experimentally in New Bedford and covered up. As is usual with leadite, the first week or so produced a little water, but it tightened right up and has given no trouble since. About 3 years ago we were about to do considerable work, about a mile and a half of 36-inch, and are now doing nearly 4 miles at Wauhegon. Of course the leadite men were around and we agreed to make a test. We put six pipes together, 3 with leadite and 3 with another substance, and put them up to 200 pounds pressure with no disastrous result. Then we started to pick up the two ends with a derrick so that we got the pipe practically suspended by the ends. I was much surprised at the elasticity of the material, for only one joint broke, which was not leadite. Then we laid the end on the ground and caulked up that break with lead and the six lengths of pipe lay in the yard for a month, absolutely tight. Since then, for the past 3 years, we have used leadite almost exclusively with very good results. I recall only one or two cases in many miles of pipe where it was used that we had to make a joint afterwards. We have laid in that time probably 7 or 8 miles of ordinary size pipe 6 to 12 inches, and over a mile of 36-inch and over a mile of 48-inch pipe. We are now laying more 48-inch and we are so well satisfied with the leadite that we are sticking right to it. We show a saving in our 48-inch joints of about 75 per cent, without taking any account of the difference in the bell hold, that is, simply on material and labor. It requires about 3 men to make a leadite joint in 10 minutes, and the same 3 men would take an hour and forty minutes to make a lead joint. That, in addition to the cost of the material, makes a difference of about 75 per cent and the saving in bell holds is additional to that.

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[10] Assistant Superintendent, Water Works, New Bedford, Mass.